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Low Cost SCADA System with Auto Fault Detection Using Micro Controller

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ABSTRACT

A low cost Supervisory Control and Data Acquisition (SCADA) system has been developed with an auto fault detection capability. The PLC used in a standard SCADA system has been eliminated by using a microprocessor chip, resulting in a lower cost. Signals derived from a large number of detectors and sensors can be processed simultaneously. The design enables the system to check the alarm status, true or false, i.e. normal, faulty sensor, or open circuit. The data acquisition circuit is interfaced with the micro controller board to evaluate the current flow conditions, normal or abnormal. A program written in Visual Basic provides for a graphical layout of the plan of the plant or building to be displayed on the monitor with a clear indication of the alarm spot. A close circuit television (CCTV) camera is made to move automatically to capture the particular location of the triggered alarm at the same time of the alarm signal.

1. INTRODUCTION

SCADA systems have been regarded with substantial interest in recent years for a variety of applications. It is especially important in complex facilities operating in real time computerized environments such as large plants, ships, aircrafts, and intelligent buildings. It produces alarm signals from around the field and informs the operators at the monitoring station to attend to a specified problem that might develop during the course of operation. At the same time CCTV cameras can be interfaced with the system to monitor particular areas in the case of alarm.

SCADA systems operation is mostly based on PLC, which is a relatively expensive item [1] in the system, and rather deficient in some functions. Replacing the PLC with a micro controller would reduce the cost of the system substantially. Adding features to the system to make it more user-friendly will result in a more attractive system. The intelligence of the system can be improved by introducing auto fault diagnosis. One of the prime concerns of SCADA engineers is how to determine real or false alarm conditions in existing security systems [2]. The proposed system provides an ability to specify the true condition of the sensor. Also, in the case of an alarm, the particular spot can be captured by automatic orientation of the camera towards the spot, and can display it instantly on the computer screen. It is thought that these intelligence features and reduced cost would make these systems more attractive to customers and help in their promotion and encourage the adoption of high tech devices.

2. SYSTEM DEVELOPMENT

The system development was carried out taking a number of factors into consideration, a system that overcomes some of the problems encountered in a standard SCADA.